MIL-C-15452C(SHIPS)
31 May 1963
SUPERSEDING
MIL-C-15452B(SHIPS)
20 December 1954

MILITARY SPECIFICATION

CABLE, SPECIAL PURPOSE (TOW), ELECTRICAL, COAXIAL, LEAD SHEATHED, NYLON COVERED

1. SCOPE

1.1 This specification covers a lead-sheathed, nylon-covered, coaxial electric tow cable to be used for continuous submerged towing at sea.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification: to the extent specified herein:

SPECIFICATIONS

FEDERAL
QQ-L-171 - Lead; Pig.
L-P-390 - Plastic, Molding Material, Polyethylene, Low and Medium Density.

MILITARY
MIL-C-915 - Cable, Cord and Wire, Electrical (Shipboard Use).

STANDARDS

MILITARY
MIL-STD-129 - Marking for Shipment and Storage.

DRAWINGS

BUREAU OF SHIPS
S1801-860288 - Standard Plan - Wire Rope Sockets - Forged Steel - Open and Closed Types.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

2.2 Other publications. - The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN IRON AND STEEL INSTITUTE
Steel Products Manual - Section 16 - Carbon Steel Wire.

(Application for copies should be addressed to the American Iron and Steel Institute, 350 Fifth Avenue, New York 1, N. Y.)

3. REQUIREMENTS

3.1 Materials. - The materials shall be as hereinafter specified. Materials not definitely specified shall be of the quality best suited for the purpose intended.

3.2 Cable. - The cable shall consist of a central stranded conductor, a layer of plastic insulation, a concentric conductor consisting of a layer of strands, a layer of plastic insulation, a layer of rayon braid, two layers of steel wire of opposite lays, a layer of lead wrapping, and a layer of nylon.

3.2.1 Central conductor. - The central conductor shall be made up of seven strands of 0.016 inch diameter, soft drawn, commercially pure copper with a maximum direct current (d. c.) resistance of 6.71 ohms per 1000 feet at 25° centigrade (C). The strands shall have a left lay of 9/16 inch ±1/32 inch. Only joints and splices conforming to MIL-C-915 shall be permitted.

3.2.2 First insulation layer. - The central conductor shall be covered by an insulating layer of polyethylene conforming to type 2, grade 7, of L-P-390, natural color, 0.020 inch thick. The insulation shall be extruded concentrically onto the conductor, and shall at no point be less than 90 percent of nominal thickness.

3.2.3 Concentric conductor. - A single layer of soft-drawn annealed, commercially pure copper wires laid helically in one direction shall be applied around the insulated central conductor to form a concentric conductor. This conductor shall consist of 24 wires, each wire having a diameter of 0.0116 inch and having a maximum d. c. resistance of 3.62 ohms per 1000 feet at 25° C. The lay shall be left 1 inch ±0.05 inch. Joints in individual wires shall be in accordance with MIL-C-915.

3.2.4 Second insulation layer. - The concentric conductor shall be covered by an extruded layer of polyethylene conforming to type 2, grade 7 of L-P-390 natural color, 0.024 inch thick. The insulation shall at no point be less than 90 percent of nominal thickness.

3.2.5 Braid. - Over the second layer of insulation there shall be applied a layer of rayon braid, 300/1/2 white rayon, 16 carriers, 18.5 picks per inch, thoroughly impregnated with a salt water immersion-resistant compound that is compatible with the underlying insulating material.

3.2.6 Armor. - Over the braid shall be applied two reverse layers, each of 18 preformed drawn galvanized mild plow steel wires. The wire shall be in accordance with section 16 of the AISI Steel Products Manual. The inner layer shall be of wires 0.028 inch diameter, the outer wire 0.039 inch diameter. The lay shall be right for the inner layer of 1-1/2 inches ± 0.075 inch and left for the outer layer of 2-1/4 inches ± 0.125 inch. It is intended that the lays balance out twist resulting from loading. The outer armor shall provide a coverage of not less than 95 percent. Each of the wires in the two layers of armor shall be uniformly preformed throughout the entire length of cable so as to hug tightly the cable core. Each armor wire shall be coated with a non-water-soluble material such as Amertex or approved equivalent.

3.2.7 Armor diameter. - The outside diameter of the armor shall be 0.290 inch minimum, 0.300 inch maximum.

3.3 Lead sheath. - The lead sheath conforming to grade B of QQ-L-171 shall be extruded concentrically over the outer layer of armor. The lead sheath shall be firmly composited with the armor. The outside of the lead sheath shall be knurled along the length of the sheath such that a minimum of 75 percent of the circumference shall be covered with a knurl having a pitch of approximately 30 and a depth of approximately 0.012 inch. The lead sheath shall remain concentric and the diameter shall be 0.400 + 0.010 - 0.000 inch after knurling. The purpose of this knurl is to prevent the outer nylon covering from slipping radially and lengthwise. The best available method of accomplishing an adequate knurl shall be utilized.

3.4 Nylon covering. - Nylon covering shall be DuPont Zytel 37X, or equal, pigmented or dyed black. The applied sheath shall be 1/32 inch thick, and concentric with the cable. The outside diameter, after application of the covering, shall be 0.460 inch minimum, 0.470 inch maximum.

3.5 Nylon finish. - Nylon finish shall be smooth, with roughness limited to 10 microinches per 1/2 inch, and shall be free of waviness, scratches, pits, bubbles, grooves, cracks, checks or inclusions. The covering shall be firmly composited with the lead sheath.

3.6 Cable length. - The cable shall be supplied in lengths of 800 feet with a tolerance of ± 10 feet.

3.7 Strength. - The finished cable shall have a minimum breaking strength of 5500 pounds minimum, 7000 pounds maximum.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Sampling. - Samples of cable for tests shall be selected in the quantity necessary to perform all tests specified herein on each production run or each 10,000 feet, whichever is less.

4.2.1 "Production run" is defined as each production length of cable regardless of shipping lengths requested in the contract or order.

4.2.2 "Lot", as hereinafter referred to, is defined as a production run or 10,000 feet, whichever is less.

4.3 Inspection of test specimens. - A part of each piece of cable required for the tests of 4.4.1 shall subsequently be taken apart to determine whether the construction of the cable is in accordance with this specification.

4.3.1 Diameter. - The outside diameter of each shipping length shall be gaged at both ends to determine conformance with 3.4. Any cable not conforming shall not be offered for delivery.

4.3.2 The preforming of the wires in the two layers of armor shall be such that if the seizing of a newly cut cable is removed, the actual diameter within one inch of the end shall be less than 0.005 inch greater than the diameter at the same point prior to its being cut.

4.4 Tests.- The tests specified in 4.4.1 through 4.4.5 shall be conducted on the samples selected in accordance with 4.2.

4.4.1 Tensile test.- Each sample shall be broken in a tension testing machine to determine conformance with 3.7. The free section of the cable shall be at least ten inches long. The lead and nylon layers may be stripped as convenient for the test.

4.4.1.1 The securing of the cable ends for the tension test shall be in accordance with Drawing S1801-860288. An alternate method may be used if the required load may be met with no sign of weakness in the connection, and if the method is satisfactory to the Government. If the suggested method is used, the conductor and insulation shall be cut out of the cable end for the length of the socket, and a plug or screw may be inserted into the end to replace the missing portion. In this method, wires within the sockets should be thoroughly cleaned.

4.4.1.2 Retest.- The failure of any sample in the test specified in 4.4.1 shall be cause for rejection of the lot represented. The contractor shall have the option of subjecting each reel of cable in a rejected lot to the test or tests wherein failure occurred and, after removing all defective lengths, to resubmit the remainder of the lot once more for inspection; then select 2 samples from each resubmitted lot for retest.

4.4.2 Faulty test methods.- If the failure of any test sample may be ascribed to faulty test methods, two additional samples may be selected for retest. The lot represented shall be accepted only if both retest samples conform to this specification.

4.4.3 Electrical tests.- On every length offered for inspection the central to concentric conductor shall have a minimum of 1000 megohms per 1000 feet of cable, and shall withstand a potential of 2000 volts rms, 60 cycle, a.c. for a duration of 5 minutes. Conductor resistance as specified in 3.2.1 and 3.2.3. Concentric conductor to armor shall have a minimum of 1000 megohms per 1000 feet of cable and shall withstand a potential of 2000 volts rms 60 cycle a.c. for a duration of 5 minutes.

4.4.4 Resistance.- The actual conductor resistance of each cable shall be measured and any value greater than those specified in 3.2.1 and 3.2.3 shall be cause for rejection; however, in the case of failure of a production run length of cable the contractor may select 800-foot sections from the rejected length which shall be measured for conductor resistance. The inspector may accept lengths shown to conform to 3.2.1 and 3.2.3.

4.4.5 Any other tests which are considered necessary by the Government may be performed to determine conformance with this specification.

4.5 Sampling and test procedures.- Procedures for sampling and testing shall be in accordance with MIL-C-915, except where otherwise specified herein.

5. PREPARATION FOR DELIVERY

5.1 Packing.- Each length of cable (see 3.6) shall be wound on a reel and shall be prepared for shipment in the same manner as specified in MIL-C-915.

5.2 In addition to any special marking required by the contract or order, shipments shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Ordering data.- Procurement documents should specify the title, number, and date of this specification.

Preparing activity:
Navy - Ships
(Project 6145-N118Sh)